

# PHYSICS NMDCAT

## TOPIC WISE TEST (UNIT- 5)

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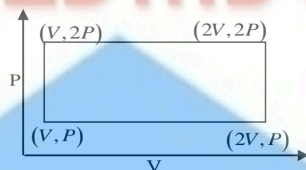
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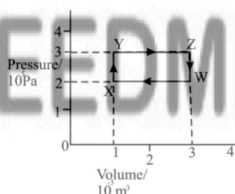
**TOPIC:**

## ✓ Thermodynamics

- Q. 1** A gas is compressed at a constant pressure of  $50 \text{ N/m}^2$  from a volume of  $10 \text{ m}^3$  to a volume of  $4 \text{ m}^3$ . Energy of  $100 \text{ J}$  then added to the gas by heating. Its internal energy is
- A. Increased by  $400 \text{ J}$   
B. Increased by  $200 \text{ J}$   
C. Increased by  $100 \text{ J}$   
D. Decreased by  $200 \text{ J}$
- Q. 2** When compressed gas is suddenly allowed to expand, which of the following equation determines the  $p - v$  relationship with  $\gamma$  being the gas constant?
- A.  $p v = \gamma$   
B.  $p v^\gamma = \text{constant}$   
C.  $v p^\gamma = \text{constant}$   
D.  $p v / \gamma = \text{constant}$
- Q. 3**  $110 \text{ J}$  of heat is added to a gaseous system, whose internal energy change is  $40 \text{ J}$ , then the amount of external work done is
- A.  $150 \text{ J}$   
B.  $70 \text{ J}$   
C.  $110 \text{ J}$   
D.  $40 \text{ J}$
- Q. 4** A thermo-dynamical system is changed from state  $(P_1, V_1)$  to  $(P_2, V_2)$  by two different process. The quantity which will remain same will be
- A.  $\Delta Q$   
B.  $\Delta W$   
C.  $\Delta Q + \Delta W$   
D.  $\Delta Q - \Delta W$
- Q. 5** In a thermodynamic system working substance is ideal gas, its internal energy is in the form of
- A. Kinetic energy only  
B. Kinetic and potential energy  
C. Potential energy  
D. None of these
- Q. 6** If  $1 \text{ mole}$  of an ideal gas is heated at constant pressure, then
- A.  $Q_p = C_v \Delta T$   
B.  $Q_p = C_p \Delta T$   
C.  $Q_v = C_v \Delta T$   
D.  $Q_v = C_p \Delta T$
- Q. 7** Thermodynamic is the study of relationship between
- A. Heat & Surrounding  
B. Heat & other form of energy  
C. Heat & Liquid  
D. Heat & chemical energy
- Q. 8** The specific heat of a gas in an isothermal process is
- A. Infinity  
B. Negative  
C. Zero  
D. Remain constant
- Q. 9** What is the factor upon which change in internal energy of an ideal gas depends?
- A. Change in volume  
B. Change in temperature  
C. Change in volume and temperature  
D. Path followed to change internal energy
- Q. 10** The equation  $W = P(V_2 - V_1)$  represent work done by a gas in
- A. Free expansion  
B. An isothermal expansion  
C. An adiabatic expansion  
D. An expansion at constant pressure
- Q. 11** The curve represents isothermal process is called
- A. Isotherm  
B. Adiabatic  
C. Both A and B  
D. Either A or B
- Q. 12** The work done on ideal gas during the cycle is



- A.  $1PV$   
B.  $2PV$   
C.  $\frac{PV}{2}$   
D. 0
- Q. 13** Heat energy added to a system under isothermal conditions appears as  
A. Work done by the system  
B. Increase in internal energy  
C. Work done on the system  
D. Increase in temperature
- Q. 14** The area under a curve on P–V diagram represents  
A. The state of a system  
B. The work done on or by the system  
C. The work done in a cyclic process  
D. Internal energy of the system
- Q. 15** When the temperature of the gas system is changed by 30K and the internal energy of the system is changed by 48J, the molar specific heat of system at constant volume will be:  
A. 0.6J/mol.K  
B. 1.0J/mol.K  
C. 1.6J/mol.K  
D. 2.1J/mol.K
- Q. 16** Molar specific heat at constant pressure is greater than molar specific heat at constant volume by an amount equal to:  
A. Universal gas constant  
B. Gravitational constant  
C. Boltzmann constant  
D. None of these
- Q. 17** Which of the following parameters does not characterize the thermodynamic state of matter?  
A. Temperature  
B. Pressure  
C. Work  
D. Volume
- Q. 18** The molar specific heat constant pressure of an ideal gas is  $7R/2$ . The ratio of specific heat at constant pressure to that at constant volume is?  
A. 9/7  
B. 8/7  
C. 7/5  
D. 5/7
- Q. 19** An ideal gas has molar specific heat  $C_p$  at constant pressure. When the temperature of  $n$  moles is increased by  $\Delta T$  the increase in the internal energy is:  
A.  $nC_p \Delta T$   
B.  $n(C_p + R) \Delta T$   
C.  $n(C_p - R) \Delta T$   
D.  $n(2C_p + R) \Delta T$
- Q. 20** Consider the ratios of the heat capacities  $\gamma = C_p/C_v$  for the three types of ideal gases: monatomic, diatomic, and polyatomic.  
A.  $\gamma$  is the greatest for monatomic gases  
B.  $\gamma$  is the greatest for polyatomic gases  
C.  $\gamma$  is the same only for diatomic and polyatomic gases  
D.  $\gamma$  is the same only for monatomic and diatomic gases
- Q. 21** A process in which no heat is added to or extracted from the system is called  
A. Adiabatic process  
B. Isothermal process  
C. Isochoric process  
D. Isobaric process
- Q. 22** A gas undergoes the cycle of pressure and volume changes  $W \rightarrow X \rightarrow Y \rightarrow Z \rightarrow W$  shown in the diagram.



What is the net work done by the gas?

- A. -600 J  
B. -200 J  
C. 0 J  
D. 200 J





- Q. 23** During adiabatic compression of a gas, its temperature
- A. Remains constant      B. Becomes zero  
C. Falls      D. Rises
- Q. 24** First law of thermodynamics is applicable for
- A. P.E      B. K.E  
C. Heat energy      D. Sound energy
- Q. 25** The direction of flow of heat between two bodies depends upon:
- A. Thermal conductivity      B. Specific Heat  
C. Internal energy      D. Temperature difference
- Q. 26** When two bodies are said to be in thermal equilibrium, then net exchange of heat between them is:
- A. Constant      B. Zero  
C. Infinite      D. Continuous flow
- Q. 27** Work done by the system on its environment is taken as:
- A. Positive      B. Negative  
C. Neutral      D. None of these
- Q. 28** The relation between work and heat of a system is:
- A. Inverse      B. Direct  
C. Both 'A' and 'B'      D. No relation
- Q. 29** Internal Energy of a body is maximum, when its temperature is:
- A. 0 K      B. 273 K  
C. 100 K      D.  $-273^{\circ}\text{C}$
- Q. 30** The system in which there is transfer of mass across its boundary is called
- A. Open system      B. Closed system  
C. Isolated system      D. Thermal system
- Q. 31** A system is described in terms of thermodynamics variables
- A. Pressure (P)      B. Volume (V)  
C. Temperature (T)      D. All of these
- Q. 32** The graphical line of isochoric process is parallel to the:
- A. Volume axis      B. Pressure axis  
C. Temperature axis      D. All of these
- Q. 33** Which of the following process, has the condition  $\Delta Q = \Delta W$ .
- A. Isochoric      B. Adiabatic  
C. Isothermal      D. Isobaric
- Q. 34** Heat is not being exchanged in a body. If its internal energy is increased, then
- A. Its temperature will increase      B. Its temperature will decrease  
C. Its temperature will remain constant      D. None of these
- Q. 35** If a system undergoes contraction of volume, then the work done by the system will be
- A. Zero      B. Negligible  
C. Negative      D. Positive
- Q. 36** In an isothermal expansion
- A. Internal energy of the gas increases  
B. Internal energy of the gas decreases  
C. Internal energy remains unchanged  
D. Average kinetic energy of gas molecule decreases
- Q. 37** A thermodynamic process in which temperature  $T$  of the system remains constant though other variable  $P$  and  $V$  may change, is called
- A. Isochoric process      B. Isothermal process  
C. Isobaric process      D. None of these
- Q. 38** The work done in an adiabatic change in a gas depends only on
- A. Change in pressure      B. Change in volume  
C. Change in temperature      D. None of the above
- Q. 39** When heat is given to a gas in an isobaric process, then
- A. The work is done by the gas      B. Internal energy of the gas increases  
C. Both 'A' and 'B'      D. None from 'A' and 'B'



- Q. 40** Which of the following is correct in terms of increasing work done for the same initial and final state?
- A. Adiabatic < Isothermal < Isobaric  
B. Isobaric < Adiabatic < Isothermal  
C. Adiabatic < Isobaric < Isothermal  
D. None of these
- Q. 41** As  $C_p - C_v = R$  shows that  $C_p > C_v$ . What is also true?
- A.  $\Delta T_p > \Delta T_v$   
B. Both 'A' and 'B'  
C.  $\Delta U_p > \Delta U_v$   
D.  $\Delta U_p = \Delta U_v$
- Q. 42** During an adiabatic expansion the increase in volume is associated with
- A. Decrease in P and decrease in T  
B. Increase in P and Increase in T  
C. Increase in P and decrease in T  
D. Decrease in P and Increase in T
- Q. 43** In a certain process, 400J of heat energy is supplied to a system and at the same time 150J of work is done by the system. What is the increase in internal energy of the system?
- A. 300 J  
B. 400J  
C. 250J  
D. 200J
- Q. 44** For 1 mole of gas the relation  $P\Delta V =$
- A.  $R\Delta T$   
B.  $R\Delta V$   
C.  $R\Delta P$   
D.  $P\Delta T$
- Q. 45** The volume of a gas expands by  $0.25 \text{ m}^3$  at a constant pressure of  $10^3 \text{ N/m}$ . The work done is equal to
- A. 250-watt  
B. 2.5 watt  
C. 250 newton  
D. 250 joule
- Q. 46** By rubbing the objects together, their internal energy:
- A. Increases  
B. Decreases  
C. Remains constant  
D. Becomes zero
- Q. 47** The rapid expansion and compression of air through which a sound wave is passing, obeys
- A. Isothermal process  
B. Isochoric process  
C. Adiabatic process  
D. Isobaric process
- Q. 48** A gas does 10J of external work in adiabatic process while expanding, then the change in internal energy is:
- A. 10 J  
B. 20 J  
C. - 10 J  
D. 0 J
- Q. 49** The relation for molar specific heat is given by:
- A.  $C_m = n\Delta Q$   
B.  $C_m = n\Delta Q\Delta T$   
C.  $C_m = \frac{1}{n} \cdot \frac{\Delta Q}{\Delta T}$   
D.  $C_m = \frac{n\Delta T}{\Delta Q}$
- Q. 50** "It is impossible to cause heat to flow from a cold body to a hot body without the expenditure of work," this statement is given by:
- A. Lord Kelvin  
B. Rudolf Clausius  
C. Newton  
D. Pascal

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